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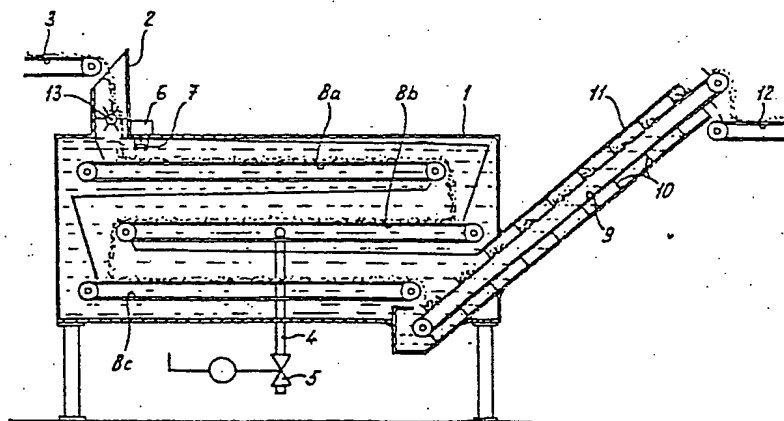
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(54) Method for packing a moist fresh chilled food product, especially fresh chilled pre-fried French fries, into boxes and a device for treating a food product with carbon dioxide.

(57) To prevent slack gas tight boxes, holding a moist food product under a carbon dioxide containing controlled atmosphere, from imploding, the product is saturated with carbon dioxide before the filled boxes are closed.



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- Method for packing a moist fresh chilled food product, especially fresh chilled pre-fried French fries, into boxes and a device for treating a food product with carbon dioxide. -

The invention relates to a method for packing a moist fresh chilled food product, especially fresh chilled pre-fried French fries, into boxes.

The industrial processing of potatoes has assumed enormous proportions. A major part of the potatoes is processed to pre-fried products (French fries and such like products).

About pre-fried French fries one should distinguish between so called fresh chilled fries stored at a temperature between 1 and 5°C, and deep frozen fries stored at a temperature of about -18°C. Fresh chilled pre-fried products having a moist content of 50 to 75 % are subject to decay. The cooled storage of French fries is limited to 7 - 14 days. This short time period is an important disadvantage of fresh chilled French fries. This is the reason that the enormous increase of pre-fried potato products is substantially taken by the deep frozen product having a long storage live. Despite of good potential possibilities of fresh chilled fries this product does not have that commercial success.

It is known to prolong the keeping quality of certain food products like meat and meat products by bringing these products into a package, evacuating the package, supplying a controlled atmosphere gas containing nitrogen and/or carbon dioxide, and closing the package hermetically. This method is not suitable for packing a moist product like fresh pre-fried French fries into rather slack boxes, because on the one hand a controlled atmosphere containing nitrogen only has insufficient influence on the keeping quality, whereas on the other hand from a mixture of nitrogen and carbon dioxide which would

have a sufficient influence, the carbon dioxide would be absorbed for an important part by the moist product which would lead to a situation in which a strong under pressure could exist in the gas tight boxes which could lead to
5 imploding of the boxes. It will be clear that it is essential for the practice of storage and distribution that the boxes may be piled up without any problem and that dented boxes are unacceptable for commercial reasons.

On the other hand vacuum resistant boxes are too
10 expensive.

It is an object of the invention to avoid these disadvantages and to provide a packing method by means of which a moist fresh chilled food product may be packed under carbon dioxide containing controlled atmosphere into
15 gas tight, rather slack boxes without having the risk of implosion of the boxes.

According to the invention the product is substantially saturated with carbon dioxide before the boxes filled with the product are closed in a gas tight way
20 in a carbon dioxide containing controlled atmosphere.

Usually the gas to be fed into the boxes will consist of a mixture of carbon dioxide and nitrogen.

The product in the boxes is tenable during at least three weeks without loss of quality when it is in a
25 cooled condition that is to say at a temperature between 0 and 5°C. As the food product is saturated with carbon dioxide, the carbon dioxide of the controlled atmosphere present in the gas tight boxes will not be absorbed by the product and no under pressure will be formed in the
30 package.

Preferably the product, moving through a housing, lies on a perforated conveyor during 20 to 60 minutes, a substantially complete carbon dioxide atmosphere being present in that housing. The time that the product has to
35 be present inside this carbon dioxide containing housing will depend on the size of the product particles.

It is also possible to saturate the product with

carbon dioxide when it is already inside the boxes.

The invention also relates to a device for treating a food product with carbon dioxide comprising a closed housing provided with a feed opening debouching
5 above a perforated conveyor, discharge means for the treated product at the discharge end of the conveyor, and means for feeding carbon dioxide into the housing.

Austrian patent specification 356 492 discloses a method of preparing a fried potato product (slices, chips,
10 fries). The purpose of this method is to reduce the fat content. The potato pieces are impregnated with a starch solution or suspension and this treated product is subjected to an intermediate drying at 80 to 220°C. Finally the product is dried to the desired water content by
15 heating it in a frying liquid. The intermediate drying at 80 to 220°C takes place in a carbon dioxide or nitrogen containing atmosphere, which despite of the high temperature leads to a light-coloured product of good flavour. The intermediate drying time is 12 to 18 minutes.
20 This is not enough to achieve saturation of the product with the inert gas.

French patent application 1 596 500 discloses a packing method for chips wherein oxygen in the package is replaced by an inert gas like carbon dioxide to increase
25 the keeping quality of the product. The package is tube shaped and closed by covers so that no oxygen can penetrate into the package. To prevent imploding the package must be strong en stiff.

The invention will further be elucidated with the
30 aid of the schematic figure showing a cross-section of a device for the saturation with carbon dioxide of a fresh moist food product like fresh pre-fried French fries.

The shown device comprises a housing 1 having a feed opening 2 for passing a food product supplied by a
35 conveyor 3. A carbon dioxide line 4 opens into the housing and includes a valve 5. This valve is controlled by a control device 6 reacting on signals of a feeler 7. A

perforated conveyor, comprising three conveyor belts 8a, 8b, 8c one above the other, is mounted in the housing. The product is moved from above downwards in a zig-zag pattern by the conveyor belts through the housing 1.

5 The discharge end of the conveyor belt 8c terminates above an elevating conveyor 9 being a conveyor belt with carriers 10 moving along the walls of a discharge tube 11.

10 The discharge end of the conveyor belt 10 terminates above a belt 12 leading to a device for packing the treated product under controlled atmosphere in gas tight boxes.

15 The purpose of this device is to saturate the fresh chilled product (temperature between 0 and 5°C) with carbon dioxide before it is transported into boxes in which a controlled atmosphere consisting of a mixture of carbon dioxide and nitrogen is formed before the boxes are closed in a gas tight way. The ratio of nitrogen and carbon dioxide will vary between 4:1 and 1:4.

20 By this pre-treatment it is prevented that the carbon dioxide present in the air tight boxes can penetrate into the product and the pressure in the boxes could be reduced so that these boxes would implode.

25 By storing the pre-fried French fries, or other suitable food product, chilled between 0 and 5°C in the controlled atmosphere, the keeping quality is increased to a period of at least three weeks. Without such a controlled atmosphere this keeping quality would be limited to 7 - 14 days.

30 The duration of the treatment of the product in the housing is 20 to 60 minutes dependent on the size of the product particles. The valve 5 controlling the supply of carbon dioxide through line 4 is opened if the feeler 7 gives the signal to the device 6 that there is too much air and not enough carbon dioxide. In principle the housing
35 should be filled with carbon dioxide substantially up to the roof.

Obviously several modifications of the shown device are possible. A rotating sluice 13 could be mounted in the supply opening 2 and also the discharge of the treated product can take place through a rotating sluice.

5 The device and the disclosed method can also be applied for the pre-treatment of other products than fresh chilled French fries. For instance the method is suitable for rösti, blanched potatoes, croquettes, vegetables for putting in soup. It is possible to drive the air out of the
10 boxes by means of the carbon dioxide/nitrogen stream. Another possibility is that the air is removed from the boxes and that thereafter the gas is admitted.

 The saturation of the product with carbon dioxide can also take place after the product is supplied in the
15 boxes. For instance the filled open boxes could be positioned in a carbon dioxide containing house after which the boxes are closed in a controlled atmosphere.

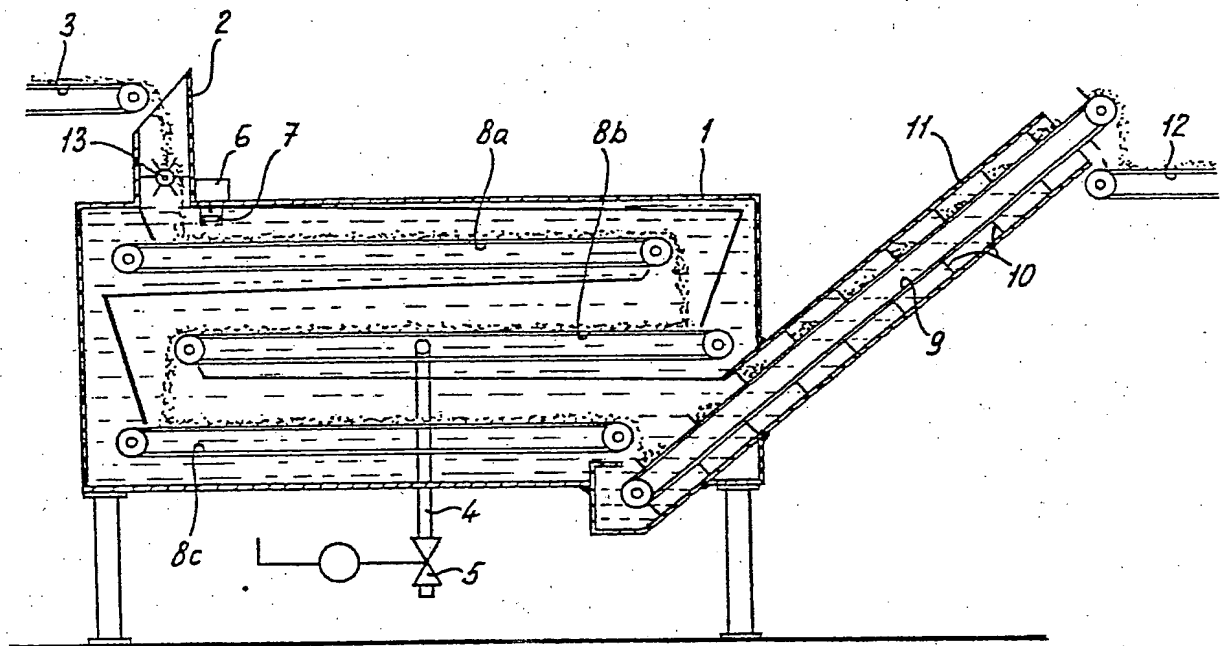
CLAIMS

1. A method for packing a moist fresh chilled food product, especially fresh chilled pre-fried French fries into boxes, characterized in, that the product is substantially saturated with carbon dioxide before the
5 boxes filled with product are closed in a carbon dioxide containing controlled atmosphere.

2. A method according to claim 1, characterized in, that the product, lying on a perforated conveyor, is led through a housing during 20 - 60 minutes in which a
10 substantially complete carbon dioxide atmosphere is present.

3. A method according to claim 1, characterized in, that the product is substantially saturated with carbon dioxide inside the boxes itself.

15 4. A device for treating a food product with carbon dioxide, comprising a closed housing having a feed opening lying above a perforated conveyor, discharge means for the treated product said means lying at the discharge end of the perforated conveyor, and means for the supply of
20 carbon dioxide into the housing.





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 2)
D,X	AT-B- 356 492 (TRANSTECHNIK) * Page 5, lines 8-21; figures; claims *	1,2,4	B 65 B 25/04 A 23 L 1/216 A 23 B 7/144
D,A	FR-A-1 596 500 (PROCTER & GAMBLE) * Page 8, lines 20-29; figure 1 *	1,3	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 2)
			B 65 B A 23 L A 23 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 05-05-1984	Examiner JAGUSIAK A.H.G.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	